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EXAMINER
MILLS, DONALD L

ART UNIT	PAPER NUMBER
2416	

NOTIFICATION DATE	DELIVERY MODE
08/21/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/549,846	LJUNG ET AL.	
	Examiner	Art Unit	
	DONALD L. MILLS	2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 May 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 11-15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claim 11, the claim is rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claim recites a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article of material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, entitled "Clarification of 'Processes' under 35 U.S.C. 101"). The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. The mere incorporation of a transmitting and receiving unit in the preamble of the claim, as well as the transmission of data in a method claim, is insufficient to meet the requirements of a statutory process. An apparatus, which performs the claimed steps, should be recited in the body of the claim.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-5, 7, 8, 11, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo et al. (US 6,714,511 B1), hereinafter referred to as Sudo, in view of Heath et al. (US 6,850,498 B2), hereinafter referred to as Heath.

Regarding claims 1, 11, 16, and 18, Sudo discloses OFDM transmission and reception for dynamically adjusting the length of the guard interval, which comprises:

A device configured to control the length of the guard interval (GI) (Referring to Figures 1 and 5, the system comprises an OFDM (OFDM by definition is the transmission and reception of symbols over a transmission channel in blocks of binary digits with a guard interval between transmission blocks) transmission and reception apparatus comprising the ability to control the length of the guard (estimating least possible guard interval length which gives rise to an intersymbol interference within acceptable limits) interval based upon a control signal. Referring to column 6, lines 39-63).

Sudo does not disclose *controlling the length of the guard interval (GI) with regard to the size of the cell in which transmitting unit is located.*

Heath teaches defining a transmission mode by the settings of various transmission parameters. Example transmission parameters which help to define a transmission mode include, but are not limited to; the transmit power, the transmit frequency, the coding scheme, the modulation scheme, the framing scheme, the modulation rate, the bandwidth, the guard region,

frame size, slot allocation, cell plan, transmission diversity, spatial multiplexing, diversity, and whether transmissions are made from a single base station or multiple base stations. The transmission modes can be utilized in different combinations and settings to create an extremely large set of possible transmission modes.

The claims are rejected under 35 U.S.C. as being unpatentable over Sudo in view of Heath. Sudo teaches an OFDM transmission and reception apparatus for dynamically adjusting the length of the guard interval. Sudo does not explicitly teach *controlling the length of the guard interval with regards to the size of the cell.* Heath teaches factoring the size of the cell in order to calculate the proper transmission parameters, such as, a cell size, but does not teach doing so in a dynamic manner. All of the component parts are known in Sudo and Heath. The only difference is the combination of the "old elements" into "single device by incorporating them into a single device. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the appropriate guard interval length based on the cell size taught by Heath in the dynamic length Guard Interval taught by Sudo. The combination could be used to achieve the predictable results of reducing interference; thereby, improving system efficiency.

Regarding claim 2, the primary reference further teaches *a guard interval adjustment unit including an adjustable guard interval parameter* (Referring to Figures 1 and 5, the system comprises an OFDM transmission and reception apparatus comprising the ability to control the length of the guard interval based upon a control signal. Referring to column 6, lines 39-51).

Regarding claim 3, the primary reference further teaches *the guard interval parameter can be changed via handling/managing system SNMP* (Note, the claim limitation does not recite

the actual changing of the guard interval parameter, it merely suggests that it is capable of being changed. Likewise, referring to Figures 1 and 5, the system comprises an OFDM transmission and reception apparatus comprising the ability to control the length of the guard interval based upon a control signal, and is capable of being changed via remote signals such as SNMP. Referring to column 6, lines 39-51).

Regarding claim 4 as explained in the rejection of claim 1, Sudo and Heath disclose all of the claim limitations of claim 1.

Sudo does not disclose *the guard interval adjustment unit calculates a guard interval with regard to the size of the current cell.*

Heath teaches defining a transmission mode by the settings of various transmission parameters. Example transmission parameters which help to define a transmission mode include, but are not limited to; the transmit power, the transmit frequency, the coding scheme, the modulation scheme, the framing scheme, the modulation rate, the bandwidth, the guard region, frame size, slot allocation, cell plan, transmission diversity, spatial multiplexing, diversity, and whether transmissions are made from a single base station or multiple base stations. The transmission modes can be utilized in different combinations and settings to create an extremely large set of possible transmission modes.

The claim is rejected under 35 U.S.C. as being unpatentable over Sudo in view of Heath. Sudo teaches an OFDM transmission and reception apparatus for dynamically adjusting the length of the guard interval. Sudo does not explicitly teach *calculating a guard interval with regard to the size of the current cell.* Heath teaches factoring the size of the cell in order to calculate the proper transmission parameters, such as, a cell size, but does not teach doing so in a

dynamic manner. All of the component parts are known in Sudo and Heath. The only difference is the combination of the "old elements" into " single device by incorporating them into a single device. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the appropriate guard interval length based on the cell size taught by Heath in the dynamic length Guard Interval taught by Sudo. The combination could be used to achieve the predictable results of reducing interference; thereby, improving system efficiency.

Regarding claim 5 as explained in the rejection of claim 1, Sudo and Heath disclose all of the claim limitations of claim 1.

Sudo does not disclose *where the guard interval has been adjusted to the size of the cell in such a way that the length of the guard interval in nanoseconds is set to, in the main, six times the cell radius in meters, that is, for a cell with the radius 100 meters, the length of the guard interval is set to/at 600 nanoseconds.*

Heath teaches defining a transmission mode by the settings of various transmission parameters. Example transmission parameters which help to define a transmission mode include, but are not limited to; the transmit power, the transmit frequency, the coding scheme, the modulation scheme, the framing scheme, the modulation rate, the bandwidth, the guard region, frame size, slot allocation, cell plan, transmission diversity, spatial multiplexing, diversity, and whether transmissions are made from a single base station or multiple base stations. The transmission modes can be utilized in different combinations and settings to create an extremely large set of possible transmission modes.

The claim is rejected under 35 U.S.C. as being unpatentable over Sudo in view of Heath. Sudo teaches an OFDM transmission and reception apparatus for dynamically adjusting the

length of the guard interval. Sudo does not explicitly teach *calculating a guard interval with regard to the size of the current cell.* Heath teaches factoring the size of the cell in order to calculate the proper transmission parameters, such as, a cell size, but does not teach doing so in a dynamic manner. All of the component parts are known in Sudo and Heath. The only difference is the combination of the "old elements" into " single device by incorporating them into a single device. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the appropriate guard interval length based on the cell size taught by Heath in the dynamic length Guard Interval taught by Sudo. The combination could be used to achieve the predictable results of reducing interference; thereby, improving system efficiency.

Regarding claim 7, the primary reference further teaches *the receiving unit is equipped with an adjustment module which adjusts the receiving unit according to the current guard interval in the cell* (Referring to Figures 1 and 5, the system comprises an OFDM transmission and reception apparatus comprising the ability to control the length of the guard interval based upon a control signal. Referring to column 6, lines 39-51).

Regarding claim 8, the primary reference further teaches *the adjustment is made through/by an operator* (Referring to Figures 1 and 5, the system comprises an OFDM transmission and reception apparatus comprising the ability to control the length of the guard interval based upon a control signal, the system is configured by an operator thereby effectively adjusting the guard interval through the operator. Referring to column 6, lines 39-51).

5. Claims 6, 9, 10, and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo et al. (US 6,714,511 B1) in view of Heath (US 6,850,498 B2) in view of Lee (US 6, 373,861 B1).

Regarding claims 6 and 12 as explained in the rejection statement of claims 1 and 11, Sudo and Heath teach all of the claim limitations of claims 1 and 11 (parent claims).

Sudo does not disclose *the guard interval adjustment unit also takes into consideration the impulse response of the transmission channel.*

Lee teaches that it is well-known that the guard interval is data obtained by copying some sample data at the rear of an OFDM symbol comprised of N data samples, and is inserted at the front of the OFDM symbol. The data in which a guard interval is inserted on an OFDM symbol unit basis, is defined as an OFDM frame. The length of the guard interval should be set longer than an impulse response length. A transmission filter 106 filters the data output from the parallel/serial converter 105 and transmits the filtered data over a radio channel 107 using an RF (Radio Frequency) module (See column 2, lines 1-16).

The claim is rejected under 35 U.S.C. as being unpatentable over Sudo in view of Heath in further view of Lee. Sudo teaches an OFDM transmission and reception apparatus for dynamically adjusting the length of the guard interval. Sudo does not explicitly teach *the guard interval adjustment unit also takes into consideration the impulse response of the transmission channel.* Lee teaches that it is well-known in the art to ensure that the length of the guard interval is set longer than the impulse response length. All of the component parts are known in Sudo and Lee. The only difference is the combination of the "old elements" into " single device by incorporating them into a single device. Thus, it would have been obvious to one of ordinary

skill in the art at the time of the invention to incorporate the appropriate guard interval length based on impulse response length as taught by Lee in the dynamic length Guard Interval taught by Sudo. The combination could be used to achieve the predictable results of reducing interference; thereby, improving system efficiency.

Regarding claims 9 and 13 as explained in the rejection statement of claims 1 and 11, Sudo and Heath teach all of the claim limitations of claims 1 and 11 (parent claims).

Sudo does not disclose *estimating the received guard interval.*

Lee teaches that is well-known in the are to utilize a frequency synchronizing device for an OFDM/CDMA communication system which exchanges data using an OFDM frame including OFDM symbols each comprised of a plurality of data samples, and a guard interval inserted at the head of each symbol to prevent interference between the symbols. The frequency synchronizing device comprises a frequency corrector for compensating for a frequency offset of received analog data according to a frequency correction signal; an analog/digital converter for converting the received analog data to OFDM frame; and a frequency synchronizer for detecting copy data which is used for creating the guard interval from the OFDM frame and is comprised of some data samples out of the OFDM symbols, to sequentially estimate coarse, regular and fine frequency offsets, and providing the frequency corrector with the frequency correction signal corresponding to the estimated frequency offsets (See column 3, lines 7-27 and column 6, line 51 to column 7, line 55).

The claim is rejected under 35 U.S.C. as being unpatentable over Sudo in view of Heath in further view of Lee. Sudo teaches an OFDM transmission and reception apparatus for dynamically adjusting the length of the guard interval. Sudo does not explicitly teach *estimating*

the received guard interval. Lee teaches that it is well-known in the art to utilize frequency offset estimation in order to perform synchronization. All of the component parts are known in Sudo and Lee. The only difference is the combination of the "old elements" into " single device by incorporating them into a single device. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the frequency offset estimation as taught by Lee in the dynamic length Guard Interval taught by Sudo. The combination could be used to achieve the predictable results of reducing interference; thereby, improving system efficiency. As well as, complying with the well-known standard OFDM for synchronization.

Regarding claims 10 and 15 as explained in the rejection statement of claims 1 and 11, Sudo and Heath teach all of the claim limitations of claims 1 and 11 (parent claims).

Sudo does not disclose *the estimation is made by calculating an estimate of the difference between received and expected block start point of time, the so called "coarse framing offset according to the specified formula.*

Lee teaches that is well-known in the are to utilize a frequency synchronizing device for an OFDM/CDMA communication system which exchanges data using an OFDM frame including OFDM symbols each comprised of a plurality of data samples, and a guard interval inserted at the head of each symbol to prevent interference between the symbols. The frequency synchronizing device comprises a frequency corrector for compensating for a frequency offset of received analog data according to a frequency correction signal; an analog/digital converter for converting the received analog data to OFDM frame; and a frequency synchronizer for detecting copy data which is used for creating the guard interval from the OFDM frame and is comprised of some data samples out of the OFDM symbols, to sequentially estimate coarse (functionally

equivalent to the claimed coarse framing offset formula), regular and fine frequency offsets, and providing the frequency corrector with the frequency correction signal corresponding to the estimated frequency offsets (See column 3, lines 7-27 and column 6, line 51 to column 7, line 55).

The claim is rejected under 35 U.S.C. as being unpatentable over Sudo in view of Heath in further view of Lee. Sudo teaches an OFDM transmission and reception apparatus for dynamically adjusting the length of the guard interval. Sudo does not explicitly teach *estimating the received guard interval.* Lee teaches that it is well-known in the art to utilize frequency offset estimation in order to perform synchronization. All of the component parts are known in Sudo and Lee. The only difference is the combination of the "old elements" into " single device by incorporating them into a single device. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the frequency offset estimation as taught by Lee in the dynamic length Guard Interval taught by Sudo. The combination could be used to achieve the predictable results of reducing interference; thereby, improving system efficiency. As well as, complying with the well-known standard OFDM for synchronization.

Regarding claim 14, the primary reference further teaches *wherein said estimation is constituted by one by operator decided guard interval* (Referring to Figures 1 and 5, the system comprises an OFDM transmission and reception apparatus comprising the ability to control the length of the guard interval based upon a control signal, the system is configured by an operator thereby effectively adjusting the guard interval through the operator. Referring to column 6, lines 39-51).

Response to Arguments

6. Applicant's arguments filed 26 May 2009 have been fully considered but they are not persuasive.

Rejection Under 35 USC 103

On page 10 of the remarks, regarding the independent claims, the Applicant argues Heath does not teach *controlling the length of the guard interval (GI) with regard to the size of the cell in which transmitting unit is located.* The Examiner respectfully disagrees. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this particular case, the rejection must be looked at as a whole. The claims are rejected under 35 U.S.C. as being unpatentable over Sudo in view of Heath. Sudo teaches an OFDM transmission and reception apparatus for dynamically adjusting the length of the guard interval. Sudo does not explicitly teach *controlling the length of the guard interval with regards to the size of the cell.* Heath teaches factoring the size of the cell in order to calculate the proper transmission parameters, such as, a cell size, but does not teach doing so in a dynamic manner. All of the component parts are known in Sudo and Heath. The only difference is the combination of the "old elements" into “single device by incorporating them into a single device. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the appropriate guard interval length based on the cell size taught by Heath in the dynamic length Guard Interval taught by Sudo. The combination

could be used to achieve the predictable results of reducing interference; thereby, improving system efficiency. It is the combination of the prior art teachings that must be reviewed, and the combination teaches controlling a guard interval and controlling transmission parameters in response to cell size. When combined, for the reasons described above, the instant claims are made obvious.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DONALD L. MILLS whose telephone number is (571)272-3094. The examiner can normally be reached on 9:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seena Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Donald L Mills/
Primary Examiner, Art Unit 2416